

## Claims

What is claimed is:

1. A method for adding a storage controller node in a storage area network, comprising:
  - receiving a storage controller node to add to a logical storage controller in the storage area network having a logical nodename and a sequence of logical ports;
  - adopting the logical nodename from the logical storage controller in place of the predetermined nodename associated with the storage controller; and
  - renumbering a set of ports associated with the storage controller to extend the sequence of logical ports associated with the logical storage controller.
2. The method of claim 1 further comprising:
  - generating configuration information reflecting the additional storage controller added to the logical storage controller and the set of ports added to the corresponding sequence of logical ports; and
  - distributing the configuration information to one or more storage controllers associated with the logical storage controller.
3. The method of claim 1 wherein the logical nodename associated with the logical storage controller is derived from a predetermined nodename associated with one storage controller.
4. The method of claim 1 wherein the predetermined nodename from the first storage controller added to the logical storage controller is used for the logical nodename.
5. The method of claim 1 wherein the logical nodename is a unique world wide node name (WWN).
6. The method of claim 1 wherein the sequence of logical ports is a contiguous numeric sequence of ports generated as sets of ports from each storage controller are added to the logical storage controller.
7. The method of claim 1 wherein each storage controller in the logical

storage controller communicates with each other over an external communication link.

8. The method of claim 1 wherein each storage controller added to the logical storage controller is designated a role selected from a set of roles including: a primary storage controller, a secondary storage controller and a alternate storage controller.

9. The method of claim 8 wherein the secondary storage controller performs tasks assigned to the primary storage controller when the primary storage controller experiences a failure.

10. The method of claim 2 wherein the configuration information generated includes metadata describing the geometry of one or more volumes of data managed by the logical storage controller.

11. The method of claim 10 wherein the metadata information is selected from a set including: number of physical devices, physical device identifiers, ranges of blocks on the physical devices and total number of blocks.

12. The method of claim 2 wherein distributing the configuration information is performed using an application programming interface compatible with one or more databases.

13. A method of removing a storage controller node in a storage area network, comprising:

removing a storage controller node from a logical storage controller in the storage area network having a logical nodename and a sequence of logical ports;

deleting the set of ports associated with the storage controller removed from the sequence of logical ports associated with the logical storage controller; and

renumbering the sequence of logical ports to accommodate the deleted set of ports.

14. The method of claim 1 further comprising:

generating configuration information reflecting the deleted storage

controller removed from the logical storage controller and the set of ports removed from the corresponding sequence of logical ports; and

distributing the configuration information to one or more storage controllers associated with the logical storage controller.

15. An apparatus for adding a storage controller node in a storage area network, comprising:

a processor capable of executing instructions;

a memory containing instructions when executed on the processor receive a storage controller node to add to a logical storage controller having a logical nodename and a sequence of logical ports in the storage area network, adopt the logical nodename from the logical storage controller in place of the predetermined nodename associated with the storage controller and renumber a set of ports associated with the storage controller to extend the sequence of logical ports associated with the logical storage controller.

16. The apparatus of claim 15 further comprising instructions that generate configuration information reflecting the additional storage controller added to the logical storage controller and the set of ports added to the corresponding sequence of logical ports and distribute the configuration information to one or more storage controllers associated with the logical storage controller.

17. The apparatus of claim 15 wherein the instructions derive the logical nodename associated with the logical storage controller from a predetermined nodename associated with one storage controller.

18. The apparatus of claim 15 wherein the instructions use the predetermined nodename from the first storage controller added to logical storage controller for the logical nodename

19. The apparatus of claim 15 wherein the logical nodename is a unique world wide node name (WWN).

20. 21. The apparatus of claim 15 wherein the sequence of logical ports is a contiguous numeric sequence of ports generated as sets of ports from each storage

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controller are added to the logical storage controller.

~~21~~ 22. The apparatus of claim 15 wherein instructions in each storage controller in the logical storage controller communicate with each other over an external communication link.

~~22~~ 23. The apparatus of claim 15 wherein instructions designate a role to each storage controller added to the logical storage controller selected from a set of roles including: a primary storage controller, a secondary storage controller and a alternate storage controller.

~~23~~ 24. The apparatus of claim 23 wherein the secondary storage controller performs tasks assigned to the primary storage controller when the primary storage controller experiences a failure.

~~24~~ 25. The apparatus of claim 16 wherein the instructions that generate the configuration information includes metadata describing the geometry of one or more volumes of data managed by the logical storage controller.

~~25~~ 26. The apparatus of claim 16 wherein instructions selected the metadata information from a set including: number of physical devices, physical device identifiers, ranges of blocks on the physical devices and total number of blocks.

~~26~~ 27. The apparatus of claim 16 wherein instructions perform distribution of the configuration information using an application programming interface compatible with one or more databases.

~~27~~ 28. An apparatus for removing a storage controller node in a storage area network, comprising:

a processor capable of executing instructions;

a memory containing instructions when executed on the processor remove a storage controller node from a logical storage controller in the storage area network having a logical nodename and a sequence of logical ports, delete the set of ports associated with the storage controller removed from the sequence of logical ports associated with the logical storage controller and renumber the sequence of logical ports to accommodate the deleted set of ports.

<sup>28</sup>~~29~~. The apparatus of claim 1 further comprising instructions that generate configuration information reflecting the deleted storage controller removed from the logical storage controller and the set of ports removed from the corresponding sequence of logical ports and distribute the configuration information to one or more storage controllers associated with the logical storage controller.